





**Ontario's Industry Emissions  
Reduction Plan:**

**Proposal for a Nitrogen Oxides (NO<sub>x</sub>)  
and Sulphur Dioxide (SO<sub>2</sub>)  
Regulation**

June 2004

Ontario's Industry Emissions  
Reduction Plan:

Proposal for a Nitrogen Oxides (NO<sub>x</sub>) and Sulphur  
Dioxide (SO<sub>2</sub>)  
Regulation

Ministry of the Environment

June 2004

Copyright: Queen's Printer for Ontario, 2004  
This publication may be reproduced for non-commercial  
purposes with appropriate attribution.



Printed on recycled paper

PIBS 4719e

4. DISTRIBUTION OF SO <sub>2</sub> ALLOWANCES .....	21
4.1 Distribution of SO <sub>2</sub> Allowances in Sub-Sectors with Fixed Allocations .....	21
4.2 Distribution of SO <sub>2</sub> Allowances in Sub-Sectors with Variable Allocations .....	22
4.2.1 SO <sub>2</sub> Sub-Sector Budgets .....	24
4.3 SO <sub>2</sub> Set-Aside for New Facilities and Facility Expansions .....	25
4.3.1 SO <sub>2</sub> Set-Aside in Sub-Sectors with Fixed Allocations .....	26
4.3.2 SO <sub>2</sub> Set-Aside in Sectors with Intensity Based Allocation Systems .....	26
5. NEXT STEPS .....	27
6. GLOSSARY .....	28

Appendix I: New Facilities to be Covered by the Proposal

Appendix II: Abatement Cost Report for NO<sub>x</sub> and SO<sub>2</sub>

Appendix III: Best Available Control Technology Economically Achievable Guideline

## FOREWORD

This Proposal presents the elements of a proposed regulation which would establish NO<sub>x</sub> and SO<sub>2</sub> industry sector emissions caps for the years 2006, 2007-2009, 2010 – 2014, and 2015 and onward as well as budgets for each sub-sector and allowance allocations for each facility within each sub-sector. The method for the distribution of NO<sub>x</sub> and SO<sub>2</sub> allowances to facilities is described, including the provisions for existing facilities that expand or re-build, new facilities, and facilities that close down or experience partial or temporary shut-down. Proposals for integrating the industry sector emissions caps with the emissions trading system and electricity sector emissions caps set out in Ontario Regulation 397/01 are also described.

The Ministry of the Environment (MOE) is proposing to develop regulation(s) based on the proposals described herein and comments received on this paper. Comments on the Proposal can be addressed in writing to:

Eric Loi  
Senior Policy Coordinator  
Air Policy and Climate Change Branch  
Ministry of the Environment  
135 St. Clair Avenue West, 4<sup>th</sup> Floor  
Toronto, Ontario M4V 1P5  
Phone: 416-314-1700  
Fax: 416-314-4128  
e-mail: [eric.loi@ene.gov.on.ca](mailto:eric.loi@ene.gov.on.ca)

Written comments are requested within 60 days from the date of public release of this Proposal.

## 1. INTRODUCTION

On October 24, 2001, Ontario announced the start of consultations on an emissions reduction plan for industry. The issues and options for addressing NO<sub>x</sub> and SO<sub>2</sub> emissions from the industry sector in Ontario were summarized in a "Discussion Paper on the Clean Air Plan for Industry: Developing NO<sub>x</sub> and SO<sub>2</sub> Emission Limits", which was released in December 2002 for a 60 day comment period. The Discussion Paper proposed an emissions reduction plan, which:

1. Requires selected industrial facilities to achieve reductions that are technically feasible and economically achievable;
2. Extends the current emissions trading system to industry sub-sectors and establishes regulatory annual NO<sub>x</sub> and/or SO<sub>2</sub> allocations to individual facilities;
3. Identifies the facilities in named sub-sectors which would face new regulatory obligations as part of this capping system. The method for identifying the facilities is based on a combination of emissions thresholds and design capacities specific to each sub-sector;
4. Identifies the types of NO<sub>x</sub> allocation systems to be used: variable<sup>1</sup>, with a recalculation<sup>2</sup> provision for use in the event increased production would cause planned allocations to exceed the industry emissions budget; and fixed systems for sub-sectors where a NO<sub>x</sub> intensity metric is either not appropriate or difficult to determine;
5. Identifies the types of SO<sub>2</sub> allocation systems to be used: variable with a recalculation<sup>2</sup> provision for use in the event increased production would cause planned allocations to exceed the industry emissions budget; and fixed systems for sub-sectors where an SO<sub>2</sub> intensity metric is either not appropriate or difficult to determine; and,
6. Requires a mix of measurement requirements based on industry, emissions levels, and equipment type, with a specific requirement for Continuous Emissions Monitors (CEMs) on large sources (i.e., boilers and process heaters and other combustion sources that are 250 mm BTU/hr heat input and greater). The requirements would be contingent on the availability of an appropriate CEMs standard for the affected sources.

---

1 Referred to as intensity-based allocations in the previous Discussion Paper.

2 Referred to as a clawback in the previous Discussion Paper.

The Discussion Paper also included an appendix with an overview of each industry's NO<sub>x</sub> and SO<sub>2</sub> emissions trends, potential control technologies and emissions reduction scenarios as well as estimated costs for abatement of NO<sub>x</sub> and SO<sub>2</sub> emissions. Since that time, the Ministry has considered stakeholder feedback and has continued to review the cost estimates and technical data. The Appendix to this Proposal includes an *Abatement Cost Report for Nitrogen Oxides (NO<sub>x</sub>) and Sulphur Dioxide (SO<sub>2</sub>)* where the revised cost estimates are presented.

## **1.1 MOVING FORWARD**

Having considered stakeholder feedback, the MOE has developed additional proposals that build on those put forward in the 2002 Discussion Paper. This document provides details on the key elements of a proposed future regulation (the Industry Emissions Reduction Plan, or Industry ERP) on NO<sub>x</sub> and SO<sub>2</sub> caps for industry.

As a result of the regulated caps described in this paper, emissions of NO<sub>x</sub> from five industry sub-sectors, which account for 10% of total provincial NO<sub>x</sub> emissions, would be capped in 2006 and these caps would be reduced over time so that by 2015 these caps are 21% below their 1990 levels. Emissions of SO<sub>2</sub> from six industry sub-sectors, which account for 61% of total provincial SO<sub>2</sub> emissions, would be capped in 2006. These caps would also be reduced over time so that by 2015 these caps are 46% below their 1994 levels. The caps are the maximum number of allowances that will be allocated in a year.

As identified in the 2002 Discussion Paper, the current emissions trading system which applies to the electricity sector would be extended to include the industry sub-sectors named in this Proposal.

These emissions caps would move Ontario to cleaner air, and assist the province in ensuring that Canada-Wide Standards for Particulate Matter and Ozone are met. The government recognizes that more action is needed to improve air quality and further programs to help reduce emissions are being developed.

### **1.1.1 Fixed and Variable Allocation Sub-sectors**

The Industry ERP proposes two types of allocation systems: variable and fixed. Variable allocations are based on production (e.g., tonnes of clinker per year in the cement sector) multiplied by an intensity rate (e.g., kg of NO<sub>x</sub> emitted per tonne of clinker). Fixed allocations are simply the emission tonnage values described in the proposed regulation. The Ministry based the proposed allocation system for each sub-sector on stakeholder preference and technical feasibility. For some sub-sectors, establishing an appropriate intensity rate has proved challenging and therefore a fixed allocation has been selected. Table 1 indicates the sub-sectors' type of allocation. Both types of allocations, used in the context of the proposed regulation, can be effective mechanisms for ensuring environmental protection. Allowances distributed by government cannot exceed sub-sector budgets regardless of the type of allocation used or the rate of economic growth in the sub-sectors.



**Table 1: Types of Allocation Systems Proposed for Sub-sectors**

Sub-Sector	Type of Allocation
Petroleum	Fixed*
Iron and Steel	Fixed
Pulp and Paper	Variable
Glass	Variable
Cement	Variable
Carbon Black	Variable
Non-ferrous Smelting	Variable

+ except for one company for SO<sub>2</sub>

### **1.1.2 Industry Sector Emissions Cap**

Setting an industrial sector emissions cap is part of this proposed regulatory system. The industry sector cap is the maximum amount of allowances that the government would give out in a specific year. The cap protects the environment by providing limits on emissions allowances made available each year. The industry sector cap is the sum of the established individual industry sub-sector budgets plus a New Source Set Aside. Caps decrease over time so that total emissions decrease over time. The New Source Set Aside provides a mechanism to accommodate growth and is described in detail later in the paper.

Emissions trading allows facilities to reach the regulated emissions caps at the lowest aggregate cost. By encouraging facilities that can reduce emissions most economically to make the greatest reductions, emissions trading reduces the overall costs of compliance to the maximum extent possible while achieving the desired environmental goals.

### **1.1.3 Sub-Sector Budgets**

A sub-sector budget is the maximum allocations granted to each sub-sector in a year. Sub-sector budgets are easily established for the iron and steel and petroleum sub-sectors as these sub-sector facilities receive allowances on a fixed allocation basis. The sub-sector budget is the sum of the facilities' allocations.

Sub-sector budgets are also defined for the cement, pulp and paper, non-ferrous smelting, glass, and carbon black sub-sectors in which facilities receive allowances on a variable-allocation basis. It is proposed that variable-allocation facilities be subject to a sub-sector recalculation of allowance allocation. For example, if the sum of the allocations calculated prior to distribution by the Director exceed the sub-sector budget

in any given year, the allocations awarded to all facilities within that sub-sector would be proportionally adjusted (reduced) until the sub-sector budget is achieved.

This approach allows each sub-sector to manage its own emissions reduction. A sub-sector recalculation of allowance allocation could be triggered by growth in production of just a few firms. However, the firms in the sub-sectors would have a better idea of future growth within the sub-sector and would therefore be able to take appropriate actions to ensure their facilities meet their individual obligations when the recalculation occurs.

#### **1.1.4 Emissions Caps, Budgets and Allocations**

Emissions caps, budgets and allocations are based on requiring industry to achieve reductions that are technically feasible and economically achievable, in addition to expected future improvements in energy conservation. This approach is intended to result in the appropriate level of NO<sub>x</sub> and SO<sub>2</sub> emissions reductions from Ontario industry and individual sub-sectors. The MOE has reviewed cost and technology data, as well as energy conservation trends, and derived emissions caps, taking into consideration requirements in the United States and elsewhere, equipment turn-over, and costs of pollution control technologies. The proposed caps and approach for each sub-sector budget and facility allocation are outlined in the subsequent sections.

#### **1.1.5 Reference Year for Variable Allocations**

For facilities that would receive variable allocations, production data would be needed to determine the allocations. The Director would determine the allocations based on the average of the highest two production years from a three year production reference period. The production reference years will be based on a rolling timeline as shown in Table 9.

#### **1.1.6 Timing of Reductions**

It is proposed that all facilities be grandfathered in the first year (2006); all facilities would receive enough allowances to continue operations at their current levels. A milestone of 2007 is proposed to provide the assurance that emissions are on a declining path. Sub-sector budgets proposed for 2007 have been set at the mid-point between current emission levels and the sub-sector budgets in 2010. Some sub-sectors have additional reductions they would have to achieve by 2015.

#### **1.1.7 Rewards for Early Action**

Some companies within the sub-sectors considered under this Proposal have voluntarily reduced emissions since the NO<sub>x</sub> and SO<sub>2</sub> baseline years (1990 and 1994 respectively). Grandfathering facilities (as described above) can overlook and indeed penalize these firms that took early action. Therefore the MOE is proposing to reward facilities that took early action by increasing their allocations. It is proposed that Ontario's industry facilities that have made early NO<sub>x</sub> and SO<sub>2</sub> reductions be rewarded on a sliding-scale

basis as follows: for NO<sub>x</sub>, a 5% reward for reductions of 45% or greater, 2% reward for reductions of 25% to 44%; for SO<sub>2</sub>, a 10% reward for reductions of 50% or greater, 5% reward for reductions of 25% to 49%. This approach recognizes facilities that may have invested significantly in efforts to reduce emissions and also considers the degree of action taken. These rewards would be for the grandfathered period only (2006) and would cease by 2007. The percentage would be applied to 2001 emissions (or another representative year) to determine the size of the credit. Early action rewards are included in facility allocation and intensity rate tables presented in this proposal.

#### **1.1.8 New Facilities and Facility Expansions**

New Industry ERP sub-sector facilities may be built at a new location in Ontario, and/or existing Industry ERP facilities may be modified or re-built with an expanded capacity after the proposed regulation comes into force. New facilities are defined as *facilities within Industry ERP sub-sectors located at a new location within Ontario (i.e., not an existing facility)*. It is proposed that Ontario's emissions reduction trading system include a New Source Set Aside (NSSA) of approximately 5.7% of total NO<sub>x</sub> allocations to industry sub-sectors in 2006, and 3.8% of total SO<sub>2</sub> allocations. The New Source Set Aside is available to all of the industry sub-sectors. All qualifying new and expanded facilities will have access to the NO<sub>x</sub> or SO<sub>2</sub> New Source Set Aside.

The size of the New Source Set Aside is significant enough to give flexibility to a new entrant, while also being protective of the airshed. Investors considering new facilities or expansions in Ontario in the sub-sectors covered by Industry ERP would be able to access the New Source Set Aside and, as long as it has not been exhausted, they would not be faced with barriers to their expansion (i.e., the need to purchase allowances). The environment is still protected because the size of the New Source Set Aside is fixed and the overall caps would not be breached.

Facility expansions are defined as *an increase in capacity through capital expenditures exceeding given cost and capacity thresholds at an existing facility or a replacement facility (see glossary)*. Because industry sub-sectors require certainty for business planning purposes, it is proposed that for significant increases in production capacity due to significant capital investment, facilities would qualify for allowances from the New Source Set Aside based on Best Available Control Technology Economically Achievable (BACTEA).

#### **1.1.9 Facility Closures and Drops in Production**

Variable allocation sub-sectors would be granted allocations based on past production, therefore, if a plant closes or reduces production, allocations would be reduced in proportion to production over time. Fixed allocation sub-sectors could receive allowances regardless of production changes. If a facility closes completely, it may still receive allowances in perpetuity unless there are provisions to reduce allowances..

For sub-sectors in which facilities would have fixed allocations, a review of the allocation occurs if there is a reduction in production by 50% or more of historical plant production in each of two consecutive years. The 50% reduction threshold and two-year criteria were selected on the basis that this would capture significant losses of production over time.

It is proposed that after the first year of a facility experiencing a reduction in production of 50% or more, full allocations would be granted in the second year. After the second year of reduced production, allocations would be reduced proportionally based on the average of the preceding last two years' reduced production. This becomes the new level of historical plant production. After five years time (from the first of the two consecutive years of the facility closure), if the facility is still closed or has production less than 50% of the historical plant production, the future allowances that otherwise would have been allocated to the facility would be redistributed to the New Source Set Aside. Allowances that are not allocated during the five year period would be retired annually.

The drawback to this approach is that for two years, a closed facility would continue to receive allowances. However, this proposed approach provides a more level playing field in that facilities with fixed allocations are treated similar to facilities that have variable allocations that would also continue to receive allowances (due to the historical three-year rolling reference year period). Further, when a facility reduces production, it is difficult to determine if the closure or reduction in production is permanent. The proposed grace period avoids penalizing facilities that are only going through temporary closure (e.g., due to slumps in demand or prolonged strikes). This proposed approach allows plants that increase production back to 50% above their historical plant production within five years to access allowances in an amount equal to the allocation they received before closure or reduction in production. If the facility is permanently closed or production remains below 50% of their historical plant production for 5 years, the allowances would be used to replenish the New Source Set Aside pool.

#### **1.1.10 Cogeneration Systems in Industrial Facilities**

The proposed regulation could create barriers to the construction of new cogeneration systems. These systems usually entail additional emissions from the facility even though total emissions from sources in the province (which currently includes coal-fired electricity generation) could decrease. To accommodate new cogeneration systems in industrial facilities, the Ministry proposes to exclude emissions from the electricity production in cogeneration systems<sup>3</sup> from the Industry ERP requirements. It is also proposed to amend O. Reg. 397/01 to allow these facilities to claim and retire allowances for electricity generation-based emissions from the O. Reg. 397/01 pool. The amendments would mean that emissions due to electricity generation are

---

<sup>3</sup> For facilities that are more than 25 MW and produce more than 20 000 MW-hours of electricity.

addressed under the existing O. Reg. 397/01, and emissions due specifically to manufacturing processes and the non-electricity emissions from cogeneration are addressed by the Industry ERP.

#### **1.1.11 Harmonizing the Nitrogen Oxides Metric in Ontario**

The Ministry proposes to change the Province's nitrogen oxides (NO<sub>x</sub>) emission reporting metric from nitrogen oxide (NO) to nitrogen dioxide (NO<sub>2</sub>). This change would facilitate emissions trading, improve the possibility of trading with other jurisdictions, and make Ontario's system consistent with the vast majority of systems in other jurisdictions.

Ontario has four regulations that have nitrogen oxides as a focus. All the regulations use nitric oxide (NO) as the metric. These regulations are:

- Monitoring and Reporting (O. Reg 127/01)
- Acid Gas (SO<sub>2</sub> and NO) Limits for OPG (O. Reg. 153/99)
- Lakeview (O. Reg. 396/01)
- Emissions Trading (O. Reg. 397/01)

The federal government and the U.S. EPA use NO<sub>2</sub> as the NO<sub>x</sub> metric even though the vast majority of the emissions from the stack are Nitric Oxide (NO). As a result, companies that must comply with the regulations above have complained about the lack of reporting harmonization. They feel that having two competing metrics creates an unnecessary and costly administrative burden. To address this issue, the Ministry proposes to amend the above regulations by changing the NO<sub>x</sub> metric from NO to NO<sub>2</sub>, with the pertinent numerical values changing as necessary. The Industry ERP regulation and O. Reg 397 would impose limits on the total NO<sub>x</sub> emissions (the total of the NO and NO<sub>2</sub> emissions). Harmonization would not detract from environmental protection.

#### **1.1.12 Other Options Assessed**

In the Discussion Paper, an industry-wide recalculation of allocation was proposed for variable allocation sub-sectors to prevent unforeseen increases in emissions and ensure industry emissions are reduced. Several stakeholders expressed concerns over this approach because growth in one sub-sector could penalize facilities in a sub-sector that is meeting its obligations. Stakeholders felt that the approach would pose an unacceptable business risk and increased uncertainty.

Many of the issues with recalculation of allocation would be avoided with fixed allocation systems. However, fixed allocation systems can dampen market competition within sub-sectors. Variable allocations provide room for industry to grow, but if growth is not

realized, it self adjusts to reduce the allocations to the facilities. This feature provides better environmental protection while facilitating competition within sub-sectors.

The reference year for production could be historical or forecasted, however many industry sub-sectors are concerned over the publication of sensitive production forecasts. Past production data are readily available and simple to verify.

Reductions could be required immediately (e.g., 2006), in steps, or only at the final target year (i.e., 2010 or 2015). An immediate requirement for reductions could impose technical and economic difficulties for companies. A requirement only for the long term does not provide the public with assurance that there is continuous improvement before 2010.

The options for dealing with new facilities include creating a pool of 'set aside' allowances, or requiring them to purchase allowances on the emissions trading market. Allocations to new facilities that apply for allowances from the set aside could be based on pre-determined intensity rates established in the proposed regulation, or on BACTEA or on lowest achievable emissions rate (LAER).

Ontario could continue to give the full fixed allocation to a closed source or immediately cease allocations. Giving the full allocation to closed facilities could actually encourage facilities to close down for monetary gain, by selling allowances to other regulated facilities, which does not lead to reductions in emissions. The threat of immediately reducing allocations to facilities may unfairly penalize facilities that are experiencing normal production cycle fluctuations. The proposal to give full allocations for a two-year period and then reduce in proportion to production is a balance that protects the environment and also provides greater certainty for Ontario industries.

## 2. DETAILS ON FACILITY ALLOCATIONS AND OBLIGATIONS

- MOE would allocate NO<sub>x</sub> and SO<sub>2</sub> allowances yearly to regulated industrial facilities in Ontario as indicated in this Proposal.
- In any given year, the total NO<sub>x</sub> and SO<sub>2</sub> allocations to industry would not exceed the values identified in Tables 2 and 3.
- NO<sub>x</sub> and SO<sub>2</sub> allowances would be distributed to facilities named in this Proposal and new facilities entering the province that meet the specifications described within each sub-sector.
- Each facility would receive NO<sub>x</sub> and/or SO<sub>2</sub> allowances based on either fixed or variable allocations, as described in this Proposal.
- Each facility affected by the proposed regulation would be required to retire allowances and/or credits equal to its annual emissions. The requirement to retire would be by March 31 in the year following the compliance year (see Table 9).
- Large sources (i.e., all cement kilns; boilers, process heaters and other combustion sources that have 250 mm BTU/hr of heat input or greater) would be required to install continuous emissions monitors (CEMs) or their equivalent to measure emissions (contingent upon the availability of an appropriate CEM standard). Sources smaller than 250 mm BTU/hr of heat input would be required to establish a constant calculation method to estimate emissions.
- Unless otherwise specified in the Proposal, all emissions trading rules specified in Ontario Regulation 397/01 – Emissions Trading and the Ontario Emissions Reduction Trading Code would apply to the facilities affected by this Proposal. The rules relating to the following areas would apply:
  - The Registry
  - Trading of allowances
  - Obligations to balance emissions with allowances/credits
  - Limitations on retirement of allowances
  - Credit creation and use
  - Banking
- At present, O. Reg. 397/01 only applies to facilities that sell electricity or convey electricity into the grid. The amendment would remove the words “that were

conveyed into the IMO-controlled grid or sold" from the four sections of the regulation where they currently appear. This amendment would remove barriers to industrial cogeneration and put all electricity generators on an equal competitive footing.

- This amendment to O.Reg. 397/01 would allow facilities named in this proposed regulation that have electricity generation capacity greater than 25 MW and that generate electricity to claim allowances from the independent power producers' pool of O. Reg. 397/01. To avoid duplication of requirements under O. Reg. 397/01 and Industry ERP, all emissions related to electricity generation would be excluded from the requirements of the Industry ERP. As such, to comply with the requirements for industrial facilities in this proposal, facilities would only be required to retire allowances and credits equal to all emissions except those due to electricity production. It is intended that emissions due to electricity production would be addressed under O.Reg. 397/01.

**Table 2: NO<sub>x</sub> emissions cap details**

Sub-Sector	Current Emissions (2001)	Sub-Sector Budgets (kilotonnes)			
		2006	2007-2009	2010-2014	2015+
Petroleum	10.4	11.9	11.0	10.2	10.2
Iron and Steel	12.7	12.8	11.8	10.9	10.9
Pulp and Paper	6.8	6.9	6.5	6.2	6.2
Glass	2.1	2.1	2.0	1.8	1.8
Cement	19.7	20.3	18.6	16.9	14.8
New Source Set Aside	n/a	3.1	3.1	3.1	3.1
<b>TOTAL</b>	<b>51.7</b>	<b>57.1</b>	<b>52.9</b>	<b>49.0</b>	<b>46.9</b>

**Table 3: SO<sub>2</sub> emissions cap details**

Sub-Sector	Current Emissions and Regulated Limits (2001)	Sub-Sector Budgets (kilotonnes)			
		2006	2007-2009	2010-2014	2015+
Petroleum	58.7	54.8	44.8	34.9	34.9
Iron and Steel	18.5	19.0	17.8	17.2	17.2



Sub-Sector	Current Emissions and Regulated Limits (2001)	Sub-Sector Budgets (kilotonnes)			
		2006	2007-2009	2010-2014	2015+
Pulp and Paper	7.5	7.6	6.6	5.8	5.8
Cement	21	22.2	21.2	19.6	15.7
Carbon Black	9.5	11.0	10.4	10.7	10.7
Non-ferrous Smelting	365	331	241	241	91
New Source Set Aside	n/a	17.1	17.1	17.1	17.1
TOTAL*	480.1	462.8	359.1	346.3	192.4

\* Note that the total sector budget would most likely be less than the sector budget in the early years because of the set aside and the allocation system used.

### 3. DISTRIBUTION OF NO<sub>x</sub> ALLOWANCES

#### 3.1 Distribution of NO<sub>x</sub> Allowances in Sub-Sectors with Fixed Allocations

- Facilities in the integrated iron and steel mills and petroleum refining sub-sectors defined in Tables 4 and 5 would receive fixed allocations for compliance years 2006 onwards in accordance with Tables 4 and 5.
- A reward for early action is incorporated into these allocations for reductions of NO<sub>x</sub> emissions from 1990 levels (or other representative base year). In Tables 4 and 5, facilities that have made reductions of 45% or greater have received a 5% reward in annual allocations in 2006. Similarly, facilities that have made reductions of 25% to 44% have received a 2% reward in annual allocations in 2006.
- Early Action Rewards were not granted to companies that reduced emissions to comply with other regulatory requirements.
- The facilities named in Tables 4 and 5 would be required to report to the Director any significant decrease (50% or greater from historical production) in production that occurs in any year.
- If there is a decrease in production of 50% or more in each of two consecutive years, the facility's allocation would be reduced proportionally. The average of these two years of production would become the new historical plant production.
- If the facility does not re-establish higher production after five years (from the first of the two consecutive years of 50% production reduction), the Director would annually distribute the future allowances from the closed facility to the new source set-aside. Allowances that are not allocated during the five year period would be retired annually.
- If part or the entire closed facility re-opens within the relevant five year period and becomes subject to the proposed regulation again, the facility must notify the Director by June 1<sup>st</sup> in the year preceding compliance year. The Director would issue the NO<sub>x</sub> allowances specified in the proposed regulation to the facility.
- The Director would notify the Registry and facility of its allocation no later than September 1<sup>st</sup> in the year preceding the compliance year.

**Table 4: NO<sub>x</sub> Allowances for Integrated Steel Mills (tonnes per year)**

Source	2006	2007-2009	2010+
Algoma, Sault Ste. Marie	3,698	3,369	3,041

Source	2006	2007-2009	2010+
Dofasco, Hamilton	3,217	2,989	2,823
Stelco Hilton Work, Hamilton	3,349	3,066	2,848
Stelco Lake Erie, Nanticoke	2,555	2,351	2,147

**Table 5: NO<sub>x</sub> Allowances for Petroleum Refiners (tonnes per year)**

Source	2006	2007-2009	2010+
Imperial Oil, Sarnia	3,164	2,912	2,660
Imperial Oil, Nanticoke	2,363	2,132	1,900
Petro-Canada, Mississauga	780	722	665
Shell Canada, Sarnia	2,174	1,942	1,710
Sunoco Inc., Sarnia	1,132	1,041	950
Nova Chemicals, Corunna	2,259	2,269	2,280

### 3.2 Distribution of NO<sub>x</sub> Allowances in Sub-Sectors with Variable Allocations

- NO<sub>x</sub> allocations for the cement, glass, and pulp and paper sub-sectors would be variable. The allocations would be based on past production data and intensity rates found in Tables 6, 7 and 8.
- Facilities in these sub-sectors would be required to submit to the Director their past production data for the years outlined in Table 9 no later than June 1st in the year preceding the compliance year.
- The Director would determine the allocations based on the average of the highest two production years from a three-year reference period.
- The production reference years would be based on a rolling three year period, as shown in Table 9.
- A reward for early action would be granted to facilities that have made significant reductions of NO<sub>x</sub> emissions from 1990 levels (or other representative year). Tables 6, 7, and 8 include: a 5% reward in allocations (in 2006) for facilities that made a reduction of 45% or greater; or a 2% reward in allocations (in 2006) for facilities that made reductions between 25% to 45%.

- In the tables, early action rewards were not granted to companies that reduced emissions to comply with other regulatory requirements.

**Table 6: NO<sub>x</sub> Intensity Rates for Grey Cement Manufacturers (kg NO<sub>x</sub>/tonne clinker)**

Source/Types	2006	2007-2009	2010-2014	2015+
Kilns > 700 kt clinker/year				
St. Marys, Bowmanville	2.8	2.4	2.0	2.0
St. Lawrence, Mississauga	2.0	2.0	2.0	2.0
Lafarge, Bath	5.4	3.7	2.0	2.0
Essroc, Picton	2.6	2.3	2.0	2.0
St. Marys, St. Marys	2.4	2.2	2.0	2.0
Kilns < 700 kt clinker/year				
Essroc, Picton	2.6	2.5	2.5	2.0
Lafarge, Woodstock	8.1	6.7	5.4	2.0

**Table 7: NO<sub>x</sub> Intensity Rates for Flat Glass (kg NO<sub>x</sub>/tonne glass)**

Source	2006	2007-2009	2010+
PPG, Owen Sound	12	12	10.8

**Table 8: NO<sub>x</sub> Intensity Rates for Pulp and Paper (kg NO<sub>x</sub>/tonne air dried pulp)**

Source	2006	2007-2009	2010+
Bowater, Thunder Bay	1.5	1.4	1.4
Kimberly Clark, Terrace Bay	1.7	1.7	1.7
Domtar, Espanola	3.5	3.4	3.4
Weyerhaeuser, Dryden	2.6	2.5	2.4
Norampac, Red Rock	0.9	0.8	0.8
Abitibi, Fort Frances	4.2	4.1	4.0

Source	2006	2007-2009	2010+
Marathon Pulp, Marathon	4.8	4.4	4.3
Tembec, Smooth Rock	6.5	6.3	6.2
Domtar, Cornwall	4.6	3.6	2.6

**Table 9: Allocation Schedule (for NO<sub>x</sub> and SO<sub>2</sub>)\***

Allocation Year	Production Reference Year	Compliance Year
2005	2002-2004	2006
2006	2003-2005	2007
2007	2004-2006	2008
2008	2005-2007	2009
2009	2006-2008	2010
2010	2007-2009	2011

\*The allocation schedule continues this pattern to compliance year 2015

### 3.2.1 Sub-Sector Budgets for NO<sub>x</sub>

- A sub-sector budget would limit the number of NO<sub>x</sub> allowances that variable allocation facilities in the sub-sectors named in Section 3.2 of this Proposal would receive.
- For any given year, the total number of NO<sub>x</sub> allowances allocated to the facilities in the sub-sector would be equal to or less than its NO<sub>x</sub> budget for that year. The proposed sub-sector NO<sub>x</sub> budgets are shown in Table 10.
- If the sum of all allowances to be given to facilities in a sub-sector exceeds the sub-sector budget for that year, the Director would proportionally adjust each facility's allocations prior to providing them to facilities until the sub-sector budget is met.
- The Director would notify the facility and the Registry of its allocation no later than September 1<sup>st</sup> in the year preceding the compliance year.

**Table 10: Sub-Sector NO<sub>x</sub> Budgets (tonnes per year)**

Sub-Sector	2006	2007-2009	2010-2014	2015+
Cement	20,315	18,592	16,868	14,768

Sub-Sector	2006	2007-2009	2010-2014	2015+
Glass	2,100	1,953	1,805	1,805
Pulp and Paper	6,901	6,481	6,176	6,176

### 3.3 NO<sub>x</sub> Set-Aside for New Facilities and Facility Expansions

- A set-aside pool of NO<sub>x</sub> allowances would be established for new Ontario facilities that are part of sub-sectors identified in Sections 3.1 and 3.2 that meet emissions thresholds defined in the regulation.
- The set-aside pool of allowances would also be available for existing facilities in Sections 3.1 and 3.2 that experience expansion.
- The allowance set-aside pool would be a fixed amount, equal to 3,100 tonnes of NO<sub>x</sub> per year, or approximately 5.7% of the total 2006 fixed allocations.
- New facilities in sub-sectors identified in Sections 3.1 and 3.2 that meet or exceed the capacity criteria and emissions threshold (as defined in Appendix I) would be allowed to apply to the Director for allowances from the set-aside pool by June 1<sup>st</sup> in the year preceding the compliance year.
- The Director would allocate allowances from the set-aside pool on the basis of a BACTEA determination, as outlined in the attached BACTEA guidance document (Appendix III).
- If the set-aside is exhausted, new facilities or expansions would not be able to claim allowances from it. New and expanded facilities would be expected to purchase allowances or credits to meet the requirements of this Proposal

#### 3.3.1 NO<sub>x</sub> Set-Aside in Sub-Sectors with Fixed Allocations

- Allowances would be issued to new facilities based on emissions achievable through the application of BACTEA. The new facility would receive a fixed NO<sub>x</sub> allocation from the set-aside either for the life of the proposed regulation or until the facility is closed.
- Expanded facilities would receive allowances for their incremental increase in production on the basis of a BACTEA determination, while retaining their original fixed allocations for the pre-existing portion of the facility.

#### 3.3.2 NO<sub>x</sub> Set-Aside in Variable Allocation Sub-Sectors

- Allowances would be added to the new facility's sub-sector budget based on emissions achievable through the application of BACTEA at the new facility and the

facility's expected production. The set-aside pool would be reduced accordingly. The increase to the sub-sector budget would be permanent for the life of the proposed regulation. The new facility would be assigned an intensity rate based on the BACTEA determination and allocations would be based on this intensity rate and production data (i.e., in the same manner as existing facilities in the sub-sector).

- In the case of facility expansions, the facility's sub-sector budget would be increased based on emissions achievable through the application of BACTEA for the facility expansion and the expected increase in production. The increase to the sub-sector budget would be permanent for the life of the proposed regulation. The expanded facility would have a new, blended intensity rate. The new blended rate would be based in part on the BACTEA determination for the incremental increase in production, while retaining the original intensity rate for the pre-existing portion of the facility. The facility's allocation would be based on this new, blended rate and production data (i.e., in the same manner as existing facilities in the sub-sector).

## 4. DISTRIBUTION OF SO<sub>2</sub> ALLOWANCES

### 4.1 Distribution of SO<sub>2</sub> Allowances in Sub-Sectors with Fixed Allocations

- Facilities in the integrated iron and steel and petroleum refining sub-sectors defined in Tables 11 and 12 would receive fixed allocations in tonnes for compliance years 2006 and onwards in accordance with Tables 11 and 12.
- A reward for early action would be granted to facilities that have made significant reductions of SO<sub>2</sub> emissions from 1994 levels (or other representative year). In Tables 11 and 12, facilities that have made reductions of 50% or greater have received a 10% reward in allocations in 2006. Similarly, facilities that have made reductions of 25% to 49% have received a 5% reward in allocations in 2006.
- Early Action Rewards were not granted to companies that reduced emissions to comply with other regulatory requirements.
- The facilities named in Tables 11 and 12 would be required to report to the Director any significant decrease (50% or greater from historical production) in production that occurs in any year.
- If there is a decrease in production of 50% or more in each of two consecutive years, the facility allocations would be reduced proportionally. The average of these two years of production would become the new historical plant production.
- If the facility does not re-establish higher production after five years (from the first of the two consecutive years of 50% production reduction), the Director would annually distribute the future allowances from the closed facility to the New Source Set Aside.
- If the facility re-establishes higher production within the relevant five year period, the facility must notify the Director by June 1 (for 2006 compliance year and beyond) in the year preceding compliance year. The Director would issue the SO<sub>2</sub> allocation specified in the proposed regulation to the facility. Allowances that are not allocated during the five year period would be retired annually.
- The Director would notify the Registry and facility of its allocation no later than September 1<sup>st</sup> in the year preceding the compliance year.

**Table 11: SO<sub>2</sub> Allowances for Integrated Steel Mills (tonnes per year)**

Source	2006	2007-2009	2010+
Algoma, Sault Ste. Marie	5,452	5,028	4,603



Source	2006	2007-2009	2010+
Dofasco, Hamilton	7,221	6,780	6,682
Stelco Hilton Work, Hamilton	3,854	3,666	3,662
Stelco Lake Erie, Nanticoke	2,471	2,358	2,245

**Table 12: SO<sub>2</sub> Allowances for Petroleum Refiners (tonnes per year)**

Source	2006	2007-2009	2010+
Imperial Oil, Sarnia	23,938	16,569	9,200
Imperial Oil, Nanticoke	6,951	6,876	6,800
Petro-Canada, Mississauga	1,931	1,920	2,000
Shell Canada, Sarnia	12,567	10,184	7,800
Sunoco Inc., Sarnia	4,000	4,000	4,000
Nova Chemicals, Corunna#	5,427	5,251	5,075

# Nova would be allocated based on intensity rates of 10 kg of SO<sub>x</sub> per tonne ethylene in 2006, 8.3 kg of SO<sub>x</sub> per tonne ethylene in 2007 – 2009, and 7.125 kg of SO<sub>x</sub> per tonne ethylene in 2010 and beyond.

#### **4.2 Distribution of SO<sub>2</sub> Allowances in Sub-Sectors with Variable Allocations**

- SO<sub>2</sub> allocations for the non-ferrous smelting, carbon black, cement, and pulp and paper sub-sectors would be determined based on past production data and intensity rates found in Tables 13, 14, 15 and 16.
- Facilities in these sub-sectors would be required to submit to the Director their past production data for the years outlined in Table 9 no later than June 1<sup>st</sup> in the year preceding the compliance year.
- The Director would base the allocations on the average of the highest two production years from a three-year reference period.
- The production reference years would be based on a rolling three year period, as shown in Table 9.
- A reward for early action would be granted to facilities that have made reductions of SO<sub>2</sub> emissions from 1994 levels (or other representative year). Tables 12, 14, 15, and 16 include: a 10% reward in allocations (in 2006) for facilities that made a reduction of 45% or greater; or a 5% reward in allocations (in 2006) for facilities that made reductions between 25% to 45%.

- In the tables, early action rewards were not granted to companies that reduced emissions to comply with other regulatory requirements.

**Table 13: Intensity Rates for Non-Ferrous Smelting Refiners (kg SO<sub>2</sub>/tonne Ni Produced)**

Source	2006	2007-2014	2015+
Inco, Sudbury	2200	1600	600
Falconbridge, Sudbury	730	580	450

**Table 14: SO<sub>2</sub> Intensity Rates for Carbon Black Manufacturers (kg SO<sub>2</sub>/tonne Carbon Black)**

Source	2006	2007-2009	2010+
Cabot Canada	77	71.5	66
Columbian Chemicals	36	36	36

**Table 15: SO<sub>2</sub> Intensity Rates for Grey Cement Manufacturers (kg SO<sub>2</sub>/tonne clinker)**

Source/Types	2006	2007-2009	2010-2014	2015+
Kilns > 700 kt clinker/year				
St. Marys, Bowmanville	2.9	2.5	2.2	2.2
St. Lawrence, Mississauga	2.2	2.2	2.2	2.2
Lafarge, Bath	4.2	3.2	2.2	2.2
Essroc, Picton	3.1	2.6	2.2	2.2
St. Marys, St. Marys	2.2	2.2	2.2	2.2
Kilns < 700 kt clinker/year				
Essroc, Picton	3.1	2.8	2.6	2.2
Lafarge, Woodstock	13.2	11.2	9.2	2.2

**Table 16: SO<sub>2</sub> Intensity Rates for Pulp and Paper (kg SO<sub>2</sub>/tonne air dried pulp)**

Source	2006	2007-2009	2010+
Bowater, Thunder Bay	0.1	0.1	0.1
Kimberly Clark, Terrace Bay	1.9	1.7	1.5
Domtar, Espanola	2.6	2.4	2.1
Weyerhaeuser, Dryden	0.7	0.6	0.6
Norampac, Red Rock	2.2	1.9	1.6
Abitibi, Fort Frances	8.2	8.2	8.2
Marathon Pulp, Marathon	12.3	8.5	5.3
Tembec, Smooth Rock	1.6	1.6	1.6
Domtar, Cornwall	12.2	10.5	8.7

#### **4.2.1 SO<sub>2</sub> Sub-Sector Budgets**

- Sub-sector budgets would limit the number of SO<sub>2</sub> allowances that variable - allocation facilities in the sub-sectors named in Section 4.2 of this Proposal would receive.
- For any given year, total number of SO<sub>2</sub> allowances allocated to the facilities in the sub-sector would be equal to or less than the SO<sub>2</sub> sub-sector budget for that year. The proposed sub-sector SO<sub>2</sub> budgets for the non-ferrous smelting sub-sector and all other sub-sectors are shown in Tables 17 and 18, respectively.
- If the sum of all allowances to be given to facilities in a sub-sector exceeds the sub-sector budget for that year, the Director would proportionally adjust each facility's allocations, prior to providing them to facilities, until the sub-sector budget is met.
- The Director would notify the Registry and the facility of its allocation no later than September 1<sup>st</sup> in the year preceding the compliance year.

**Table 17: Sub-Sector SO<sub>2</sub> Budgets for Non-Ferrous Smelting (tonnes per year)**

Source	2006	2007-2014	2015+
Inco, Sudbury	265,000	175,000	66,000
Falconbridge, Sudbury	66,000	66,000	25,000

**Table 18: Sub-Sector SO<sub>2</sub> Budgets for Other Industry Sub-Sectors (tonnes per year)**

Sub-Sector	2006	2007-2009	2010-2014	2015+
Carbon Black	11,000	10,439	10,700	10,700
Cement	22,210	21,228	19,581	15,659
Pulp and Paper	7,636	6,642	5,782	5,782

### 4.3 SO<sub>2</sub> Set-Aside for New Facilities and Facility Expansions

- A set-aside pool of SO<sub>2</sub> allowances would be established for new Ontario facilities that are part of sub-sectors identified in Sections 4.1 and 4.2 that meet thresholds defined in the regulation.
- The set-aside pool of allowances would also be available for existing facilities in Sections 4.1 and 4.2 that experience expansion.
- The allowance set-aside pool would be a fixed amount, equal to 17,100 tonnes of SO<sub>2</sub> per year, or approximately 3.8% of the total 2006 allocations.
- New facilities in sub-sectors identified in Sections 4.1 and 4.2 that meet or exceed the capacity criteria and emission threshold (as defined in Appendix I) would be allowed to apply to the Director for allowances from the set-aside pool by June 1<sup>st</sup> in the year preceding the compliance year.
- The Director would allocate allowances from the set-aside pool on the basis of a BACTEA determination, as outlined in the attached BACTEA guidance document (Appendix III).
- If the set-aside is exhausted, new facilities or expansions would not be able to claim allowances from it. The new and expanded facilities would be expected to purchase allowances or credits to meet the requirements of this Proposal.

#### **4.3.1 SO<sub>2</sub> Set-Aside in Sub-Sectors with Fixed Allocations**

- Allowances would be issued to new facilities based on emissions achievable through the application of BACTEA. The new facility would receive a fixed SO<sub>2</sub> allocation from the set-aside either for the life of the proposed regulation or until the facility is closed.
- Expanded facilities would receive allowances for their incremental increase in production on the basis of a BACTEA determination, while retaining their original fixed allocations for the pre-existing portion of their facility.

#### **4.3.2 SO<sub>2</sub> Set-Aside in Sectors with Intensity Based Allocation Systems**

- Allowances would be added to the facility's sub-sector's budget based on emissions achievable through the application of BACTEA at the new facility and the facility's expected production. The set-aside pool will be reduced accordingly. The increase to the sub-sector budget would be permanent for the life of the proposed regulation. The new facility would be assigned an intensity rate based on the BACTEA determination and allocations would be based on this intensity rate and production data (i.e., in the same manner as existing facilities in the sub-sector).
- In the case of facility expansions, the facility's sub-sector budget would be increased based on emissions achievable through the application of BACTEA for the facility expansion and the expected increase in production. The set-aside pool will be reduced accordingly. The increase to the sub-sector budget would be permanent for the life of the proposed regulation. The expanded facility would have a new, blended intensity rate. The new blended rate would be based in part on the BACTEA determination for the incremental increase in production, while retaining the original intensity rate for the pre-existing portion of the facility. The facility's allocation would be based on this new, blended rate and production data (i.e., in the same manner as existing facilities in the sub-sector).

## 5. NEXT STEPS

We encourage everyone to review and provide input on this Industry Emissions Reduction Plan. Your input is crucial in shaping the future direction of a reduction program for NO<sub>x</sub> and SO<sub>2</sub> for industry. In parallel, the Ministry will continue its review of options and activities for addressing other sectors of the economy (such as the residential, institutional and commercial) as we move to achieve the provincial goals for reductions of NO<sub>x</sub> and SO<sub>2</sub> and cleaner air

Next steps will be developed based on the Proposal outlined herein and on comments received. Comments on this Proposal should be addressed in writing to:

Eric Loi  
Senior Policy Coordinator  
Air Policy and Climate Change Branch  
Ministry of the Environment  
135 St. Clair Avenue West, 4<sup>th</sup> Floor  
Toronto, Ontario  
M4V 1P5

Phone: 416-314-1700

Fax: 416-314-4128

e-mail: [eric.loi@ene.gov.on.ca](mailto:eric.loi@ene.gov.on.ca)

Comments are requested within 60 days from the date of public release of this Proposal.

## 6. GLOSSARY

Allocation – number of allowances the MOE transfers in a given year to a facility named in the regulation; the act of making such a transfer

Allowance – A certificate for one metric tonne of a given pollutant such as nitrogen oxides or sulphur dioxide which can be used to meet obligations to balance emissions (tonne for tonne) in a given year.

Annual Plant Emissions – for the purpose of true-up includes all emissions from the plant except for emissions due directly to the generation of electricity.

Budget, Sub-sector budget – maximum number of allowances the Director may distribute to all facilities in a sub-sector in a given year for a given pollutant.

Capacity threshold for facility expansion - A production increase is significant if the new level of production from the facility is equal to or more than 30 per cent greater than historical plant production.

Constant Calculation Method – A constant calculation method is one which uses the same methods used to provide emissions inventories which were considered when future caps were set.

Cost threshold for facility expansion - A capital expenditure is significant if the cost of the modification is equal to or greater than 30 per cent of the replacement cost of the process or the new equipment it modifies.

Dedicated Allocation Stream – a term used with sub-sectors whose allowances are distributed on a fixed-allocation basis. Refers to the stream of allowances described in the regulation for potential allocation to a specified facility.

Emissions Cap – the total number of allowances that the Director may distribute in any given year.

Facility expansion - Facility expansion is defined as a significant increase in total production capacity above the defined capacity threshold at an existing facility which comes about through a significant capital expenditure above the defined cost threshold.

Fixed allocation – allowance transfer from MOE to a facility where the number of allowances transferred does not vary from that set out in the regulation; allocation is predetermined and known to all.

Historical Plant Production – is the average production rate of the facilities, based on the highest two of the last three years' production data, prior to the first compliance year for the facility

Intensity rate – an emission rate expressed in tonnes of pollutant per unit of production. MOE multiplies average production by an intensity rate set forth in the regulation to arrive at an annual allocation for facilities in variable allocation sub-sectors

New facility - facilities belonging in sub-sectors named in the regulation, constructed after the regulation is in effect, and located at a new location within Ontario (i.e. not an existing facility).

New Source Set Aside – allowances reserved for allocation to new and expanded facilities; there is one set aside each for  $\text{NO}_x$  and  $\text{SO}_2$ .

New Source Set Aside Budget – the number of allowances in each ( $\text{NO}_x$  and  $\text{SO}_2$ ) New Source Set Aside

Nitrogen Oxides ( $\text{NO}_x$ ) – refers to the sum of nitric oxide ( $\text{NO}$ ) and nitrogen dioxide ( $\text{NO}_2$ ). Both  $\text{NO}_2$  and  $\text{NO}$  must be expressed on an  $\text{NO}_2$  equivalent basis before the individual quantities are combined for the total  $\text{NO}_x$  release

Variable allocation – transfer of allowances from the MOE to a facility that varies from year to year in proportion to the given facility's production; number of allowances in the allocation normally determined by multiplying the intensity rate set forth in the regulation by the facility's average production; average production based on the highest two years of production from the most recent three



## Appendix I – New Facilities to be Covered by The Proposal

Sub-Sector	Capacity Criteria	Pollutant Emitted	Emissions Threshold (tonnes/year)
Integrated Kraft Pulp and Paper Mills	100,000 tonnes Air Dried Pulp per year	NO <sub>x</sub> and/or SO <sub>2</sub>	100
Nickel/Copper Smelter	1,000 tonnes Nickel or Copper per year	SO <sub>2</sub>	5,000
Integrated Iron and Steel	1,000,000 tonnes Steel shipped per year	NO <sub>x</sub> and/or SO <sub>2</sub>	100
Petroleum Refinery	50,000 barrels oil per day	NO <sub>x</sub> and/or SO <sub>2</sub>	100
Carbon Black	25,000 tonnes Carbon Black per year	SO <sub>2</sub>	100
Flat Glass	50,000 tonnes Flat Glass per year	NO <sub>x</sub>	100
Grey Cement	100,000 tonnes Clinker per year	NO <sub>x</sub> and/or SO <sub>2</sub>	100





